

## Ultrafast Avalanche SMD Rectifier

## BYG20D, BYG20G, BYG20J Vishaymas General Semiconductor



**SMA (DO-214AC)**

### FEATURES

- Low profile package
- Ideal for automated placement
- Glass passivated pellet chip junction
- Low reverse current
- Soft recovery characteristics
- Ultrafast reverse recovery time
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- AEC-Q101 qualified available  
- Automotive ordering code: base P/NHE3 or P/NHM3
- Material categorization: for definitions of compliance please see [www.vishaymas.com](http://www.vishaymas.com)

PRIMARY CHARACTERISTICS	
$I_{F(AV)}$	1.5 A
$V_{RRM}$	200 V, 400 V, 600 V
$I_{FSM}$	30 A
$I_R$	1.0 $\mu$ A
$V_F$ at $I_F$	1.4 V
$t_{rr}$	75 ns
$E_R$	20 mJ
$T_J$ max.	150 °C
Package	SMA (DO-214AC)
Diode variations	Single

### TYPICAL APPLICATIONS

For use in high frequency rectification of power supply, inverters, converters, and freewheeling diodes for consumer, automotive, and telecommunication.

### MECHANICAL DATA

**Case:** SMA (DO-214AC)

Molding compound meets UL 94 V-0 flammability rating

Base P/N-E3 - RoHS-compliant, commercial grade

Base P/N-M3 - halogen-free, RoHS-compliant, commercial grade

Base P/NHE3\_X - RoHS-compliant and AEC-Q101 qualified

Base P/NHM3\_X - halogen-free, RoHS-compliant and AEC-Q101 qualified

("\_X" denotes revision code e.g. A, B,...)

**Terminals:** matte tin plated leads, solderable per J-STD-002 and JESD 22-B102

E3, M3, HE3, HM3 suffix meet JESD 201 class 2 whisker test

**Polarity:** Color band denotes the cathode end

MAXIMUM RATINGS ( $T_A = 25\text{ °C}$ unless otherwise noted)					
PARAMETER	SYMBOL	BYG20D	BYG20G	BYG20J	UNIT
Device marking code		BYG20D	BYG20G	BYG20J	
Maximum repetitive peak reverse voltage	$V_{RRM}$	200	400	600	V
Average forward current	$I_{F(AV)}$	1.5			A
Peak forward surge current 10 ms single half sine-wave superimposed on rated load	$I_{FSM}$	30			A
Pulse energy in avalanche mode, non repetitive (inductive load switch off) $I_{(BR)R} = 1\text{ A}, T_J = 25\text{ °C}$	$E_R$	20			mJ
Operating junction and storage temperature range	$T_J, T_{STG}$	-55 to +150			°C

ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)							
PARAMETER	TEST CONDITIONS		SYMBOL	BYG20D	BYG20G	BYG20J	UNIT
Maximum instantaneous forward voltage	$I_F = 1\text{ A}$	$T_J = 25\text{ }^\circ\text{C}$	$V_F^{(1)}$	1.3			V
	$I_F = 1.5\text{ A}$			1.4			
Maximum DC reverse current	$V_R = V_{RRM}$	$T_J = 25\text{ }^\circ\text{C}$	$I_R$	1			$\mu\text{A}$
		$T_J = 100\text{ }^\circ\text{C}$		10			
Maximum reverse recovery time	$I_F = 0.5\text{ A}, I_R = 1.0\text{ A}, I_{rr} = 0.25\text{ A}$		$t_{rr}$	75			ns

**Note**

(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

THERMAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$ unless otherwise noted)					
PARAMETER	SYMBOL	BYG20D	BYG20G	BYG20J	UNIT
Typical thermal resistance, junction to lead, $T_L = \text{const.}$	$R_{\theta JL}$	25			$^\circ\text{C/W}$
Typical thermal resistance, junction to ambient	$R_{\theta JA}^{(1)}$	150			$^\circ\text{C/W}$
	$R_{\theta JA}^{(2)}$	125			
	$R_{\theta JA}^{(3)}$	100			

**Notes**

- (1) Mounted on epoxy-glass hard tissue  
(2) Mounted on epoxy-glass hard tissue, 50 mm<sup>2</sup> 35  $\mu\text{m}$  Cu  
(3) Mounted on Al-oxide-ceramic (Al<sub>2</sub>O<sub>3</sub>), 50 mm<sup>2</sup> 35  $\mu\text{m}$  Cu

ORDERING INFORMATION (Example)				
PREFERRED P/N	UNIT WEIGHT (g)	PREFERRED PACKAGE CODE	BASE QUANTITY	DELIVERY MODE
BYG20M-E3/TR	0.064	TR	1800	7" diameter plastic tape and reel
BYG20M-E3/TR3	0.064	TR3	7500	13" diameter plastic tape and reel
BYG20MHE3_A/H <sup>(1)</sup>	0.064	H	1800	7" diameter plastic tape and reel
BYG20MHE3_A/I <sup>(1)</sup>	0.064	I	7500	13" diameter plastic tape and reel
BYG20M-M3/TR	0.064	TR	1800	7" diameter plastic tape and reel
BYG20M-M3/TR3	0.064	TR3	7500	13" diameter plastic tape and reel
BYG20MHM3_A/H <sup>(1)</sup>	0.064	H	1800	7" diameter plastic tape and reel
BYG20MHM3_A/I <sup>(1)</sup>	0.064	I	7500	13" diameter plastic tape and reel

**Note**

(1) AEC-Q101 qualified

**RATINGS AND CHARACTERISTICS CURVES** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted)

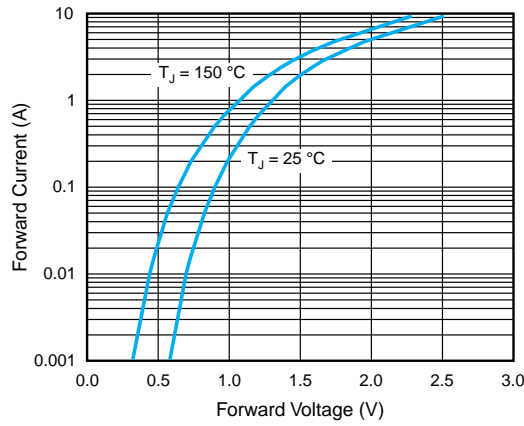


Fig. 1 - Forward Current vs. Forward Voltage

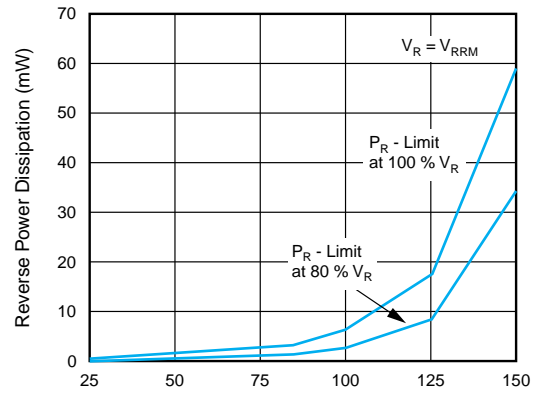


Fig. 4 - Max. Reverse Power Dissipation vs. Junction Temperature

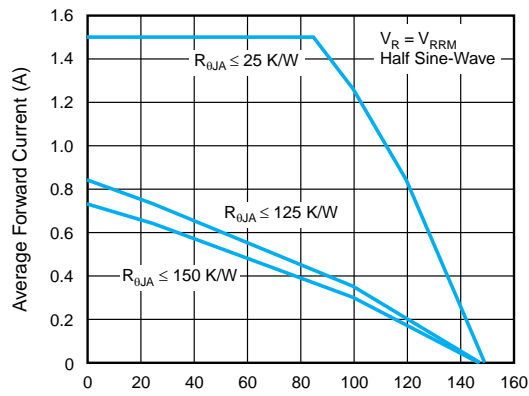


Fig. 2 - Max. Average Forward Current vs. Ambient Temperature

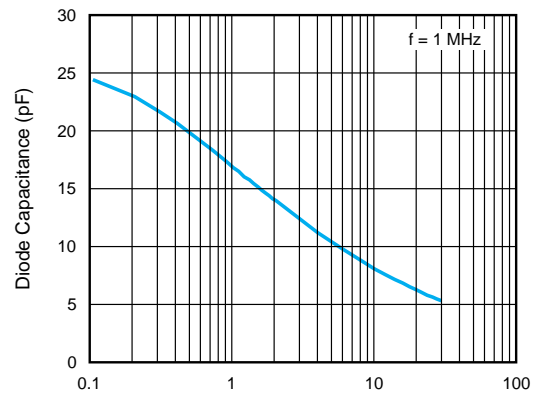


Fig. 5 - Diode Capacitance vs. Reverse Voltage

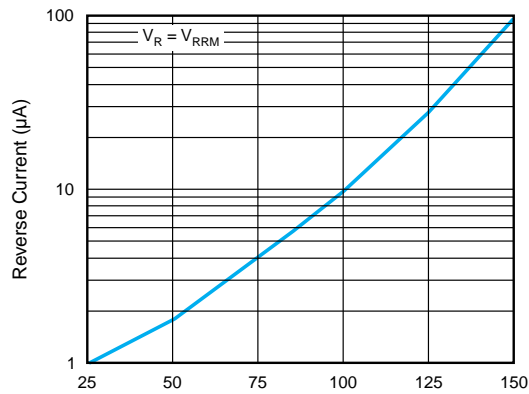


Fig. 3 - Reverse Current vs. Junction Temperature

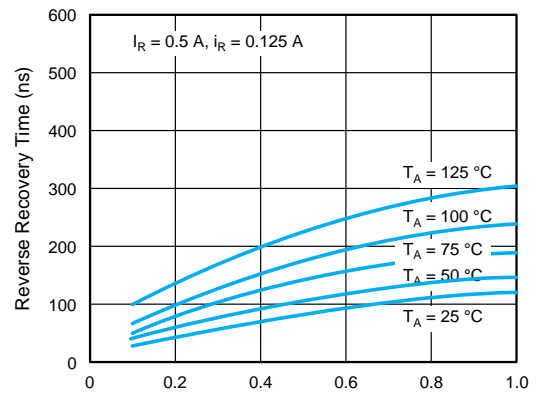


Fig. 6 - Reverse Recovery Time vs. Forward Current

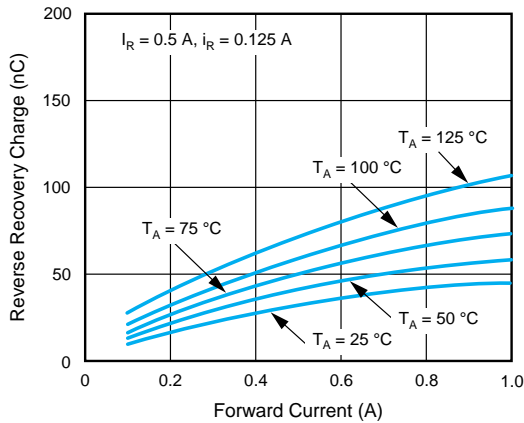


Fig. 7 - Reverse Recovery Charge vs. Forward Current

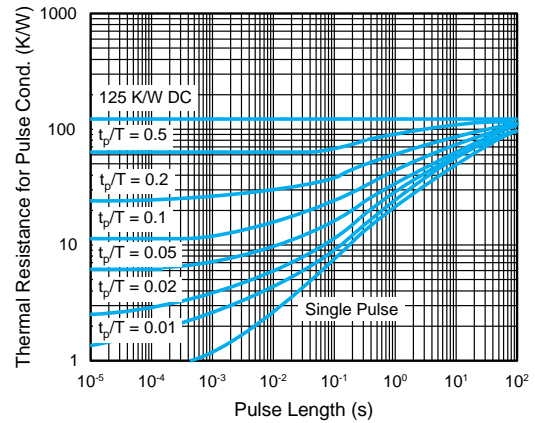


Fig. 8 - Thermal Response

**PACKAGE OUTLINE DIMENSIONS in inches (millimeters)**

